New Aphid Threatens U.S. Soybeans

Midwestern soybean growers were caught unprepared for a visit from a foreign aphid during the summer of 2000.

Native to Asia, *Aphis glycines* was found in soybean fields in Illinois and neighboring states. It is not known how it came from Asia and got a foothold in the Midwest.

"*A. glycines* was not documented in the United States until last year and has become more of a problem in 2001 than 2000," says ARS plant pathologist Glen L. Hartman in ARS' Soybean/Maize Germplasm, Pathology, and Genetics Research Unit in Urbana, Illinois. These aphids not only devastate soybean plants by feeding on them, they also spread serious viruses, such as soybean mosaic virus (SMV)—one of the most common soybean viruses in Illinois.

Aphids are the most important and most numerous vectors of plant viruses and are responsible for significant crop losses each year. Yield losses of 60 percent have been reported when plants are infected with SMV and bean pod mottle virus.

Hartman, his ARS colleagues Leslie L. Domier and Loyd M. Wax, and scientists at the University of Illinois and Illinois Natural History Survey speculate that the soybean aphid may have been living in the Midwest for several years before becoming problematic. Mild summer temperatures last year may have spurred the increase in aphid populations.

At first, it had to be determined that these aphids were indeed soybean aphids and not cotton or melon aphids, which they closely resemble. To make that determination, ARS entomologist Manya B. Stoetzel at the Systematic Entomology Laboratory in Beltsville, Maryland, and David Voegtlin at the Illinois Natural History Survey, in Champaign, examined the aphids under a microscope to see the tiny structures that can differentiate aphids.

The researchers are studying the aphid's basic biology, attempting to monitor its movement, assessing its impact on soybean yields, determining its importance as a vector of soybean viruses, and planning potential management strategies. Chief emphasis will be given to evaluating soybean germplasm for resistance to the aphid and improving soybean resistance to SMV.—By **Linda McGraw,** formerly with ARS.

Glen L. Hartman is in the USDA-ARS Soybean/Maize Germplasm, Pathology, and Genetics Research Unit, 1101 West Peabody, Urbana, IL 61801; phone (217) 244-3258, fax (217) 244-7703, e-mail ghartman@uiuc.edu. ◆

High-Maysin Corn Available for Breeding

Agricultural Research Service scientists are accepting seed requests for new corn populations whose silks deter caterpillar feeding with a natural repellant called maysin.

By crossing the maysin-rich corn with elite commercial lines, plant breeders can eventually provide farmers with hybrids that will fare better against lepidopteran pests like the corn earworm. Its caterpillar stage causes $100 million annually in yield losses and control costs.

"The high-maysin material available now includes two corn populations," says Neil W. Widstrom, a geneticist in ARS' Crop Genetics and Breeding Research Unit at Tifton, Georgia. "It will be most useful to sweet-corn breeders, since there's more concern about ear damage for that crop than for dent corn."

Registration of EPM6 (a purple-kerneled population) and SIM6 (a yellow-kerneled population) in the November-December 2001 issue of *Crop Science* concludes 23 years of maysin research by scientists at ARS laboratories in Berkeley, California; Columbia, Missouri; and Tifton, Georgia, in cooperation with the University of Georgia.

The Tifton group, led by Widstrom, also concluded a 5-year cooperative research and development agreement this summer with Syngenta Seeds, Inc.—formerly Novartis—by providing the company with four high-maysin inbred sweet-corn lines.

Through breeding and backcrossing, scientists took a two-pronged approach to curbing earworm damage: First, they selected plants whose silks produce enough maysin to stop the caterpillar from feeding after just a few bites. Second, they chose plants with tight husks that force the pest to chew the silks before the kernels, which don't contain maysin.

Maysin works by binding up certain proteins in the earworm's gut so that it cannot grow. But humans, other animals, and beneficial insects face no danger from maysin.

Currently, farmers battle earworms with chemical insecticides. In Florida, where half the nation's fresh-market sweet corn is grown, this can often mean spraying 30-40 times a season to ensure the blemish-free ears consumers desire.

But with high-maysin hybrids, scientists predict, insecticide use could be cut in half. Their optimism is rooted in laboratory and field trials showing higher earworm mortality rates and less ear damage in high-maysin corn than in nonmaysin corn.

The ARS effort in Tifton has demonstrated that transferring maysin to silks of elite inbred lines is feasible, says Widstrom, adding "we'll honor requests for breeder seed of the released high-maysin populations for at least 5 years." Samples are limited to 100 grams, or about 300 to 500 seeds per request.—By **Jan Suszkiw,** ARS.

Neil W. Widstrom is in the USDA-ARS Crop Genetics and Breeding Research Unit, 2747 Davis Rd., Tifton, GA 31794; phone (229) 387-2341, fax (229) 387-2321, e-mail nwidstro@tifton.cpes.peachnet.edu. ◆